Selected Data

on

MARKETING FRESH SWEET CORN

for

The Sweet Corn Short Course

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Marketing Fresh Sweet Corn

Most studies in fresh sweet corn marketing have agreed on the nature of the problem but few or none have had the complete story including costs and consumer reaction. For instance, in marketing fresh sweet corn in the midwest the following appeared: 1/

> "The market and culinary quality of vegetables has become of major importance to producers, principally because of competitive factors which have enabled the consumer to discriminate more in regard to quality when purchasing vegetables.
>
> This is true both for individual producers and for areas, since areas tend to be identified with a particular quality of product. In order for market growers in an area to maintain their position in the production of fresh vegetables, they not only must produce vegetables of high quality, but also must maintain that quality from harvest to consumer; at the same time they must meet quality and price competition of vegetables from other areas. In fresh sweet corn the maintaining of quality is particularly important. If improperly handled from the farm to the store or in the store, quality deteriorates markedly in a few hours.
>
> Quality in sweet corn appears to be dependent on sweetness, flavor, tenderness, and succulence. Tenderness and succulence are used to determine the proper picking maturity, at which time the sugar content is near maximum. After harvest there is a rapid loss in the four quality factors, particularly sugar, unless the sweet corn is quickly cooled below 40° F.

1/ Marketing Fresh Sweet Corn in the Midwest, North Central Regional Publications 45, Univ. of Minnesota, Agr. Exp. Sta., 1954

As early as 1919, Appleman and Arthur presented data showing that sweet corn stored one day at 86° F. lost 50 percent of its total sugar, while sweet corn stored at 68° F. lost 26 percent; at 50° F., 17 percent; and at 32° F., only 8 percent of its sugar during the same period of time. These authors also found that after harvest sugar is lost from sweet corn until equilibrium is reached when the total sugar has decreased about 62 percent and the sucrose about 70 percent. Raising or lowering the temperature of the sweet corn simply hastens or delays the attainment of the equilibrium, which seems to be about the same for all temperatures.

At about the same time Stevens and Higgins found that after one day's storage sweet corn stored at 68° F. contained approximately half as much sugar as did sweet corn stored at 50° F. More recently, a number of investigations have demonstrated the desirable quality of properly cooled sweet corn. Several of these studies include cost data for certain cooling and handling operations. None, however, include a breakdown of handling costs from farm to consumer for several types of precooled and not-precooled sweet corn, together with comparative net retail margins for the various types involved."

The following costs were for 1950 and would be of use mainly to indicate relative costs for the different methods of operation costs in some instances are substantially higher than in 1950. In Table 1 the costs of icing corn were shown to be about 2 cents per dozen more than

for the same corn sold untrimmed. While trimming in the store cost almost 5 cents while prepackaging in the store (in cellophane) about 13 cents more.

Table 1. Calculated Costs per Dozen Ears of Picking, Handling, and Retailing Precooled and Not-precooled Sweet Corn by Six Methods, Minnesota, 1950-1952*

	Cost in cents per dozen ears					
	Precooled (farm and store iced)				Not precooled or iced	
	In husk		Prepackaged		In husk	
	Displayed untrimmed	Trimmed in store	At Farm	At Store	Displayed untrimmed	Trimmed in store
At farm						
Picking, packaging, other labor 1/.....	2.0	2.0	6.8	2.0	2.0	2.0
Ice	1.1	1.1	1.5	1.1	-	-
Packaging materials	0.1	0.1	6.8	0.1	0.1	0.1
Depreciation, repairs2/.....	-	-	1.5	-	-	-
At store						
Display, trimming, other labor 3/.....	2.7	7.4	2.5	13.0	2.7	7.4
Ice 4/.....	0.7	0.7	0.7	0.7	-	-
Packaging materials 5/	1.1	0.9	-	4.0	1.1	0.9
Total	7.7	12.2	19.8	20.9	5.9	10.4

* Transportation, store overhead, and expense for supervisory labor not included.

1/Farm labor at rate of $.85 an hour, store labor at $1 an hour.

2/From table 7.

3/Includes the labor cost of handling the chipped ice. The store cost was increased 1.0 cents per dozen ears when blocks of ice were used with chipped ice.

4/Includes the cost of paper bags used in retail stores.

Note: The costs for prepackaged corn do not include an allowance for waste as no purchase price was involved prior to prepackaging. Waste was very low, estimated at only 1 percent, equivalent to about 0.3 cents per dozen ears.

The greatest individual farm cost was that of labor although this was calculated in the study at $0.85 per hour. The total of all the supplies and ice used for the iced and prepackaged sweet corn was greater than the labor cost. In this study the added cost for icing was only 1.1 cents per dozen greater at the farm than for non-iced corn. Icing was done by putting ice in the bag of corn at field temperature, a questionable and not too effective practice. Corn prepackaged at the farm level cost about 14.5 cents per dozen more than that sold uniced and unpackaged.

Table 2. Estimated Cost of Equipment, Labor, and Supplies for Three Methods of Handling Sweet Corn on the Farm, Minnesota, 1950

Item	Cost in cents per dozen ears		
	Husked, precooled, packaged, iced and refrigerated	Left in Husk, Iced and refrigerated	Left in Husk, without refrigeration
Labor 1/			
Harvesting	2.0	2.0	2.0
Husking and cooling	2.4	-	-
Packaging	2.4	-	-
Total labor	6.8	2.0	2.0
Supplies			
Cellophane 300 LSAT(13x18 in. sheets)	2.1	-	-
Sealing tape (locker tape)	0.9	-	-
Ice for top-icing master containers	1.3	-	-
Ice for precooling 2/	0.2	-	-
Ice for corn in burlap bags	-	1.1	-
Master container (bu.basker & cover)	3.8	-	-
Burlap bag (reused about 32 times)	-	0.1	0.1
Total supplies	8.3	1.2	0.1
Equipment, depreciation, and repairs			
Precooling tanks, water system, cooler, tables, husking machine 3/	1.5	-	-
Total cost per dozen ears	16.6	3.2	2.1

Footnotes for preceeding table:

1/ Not including management overhead.

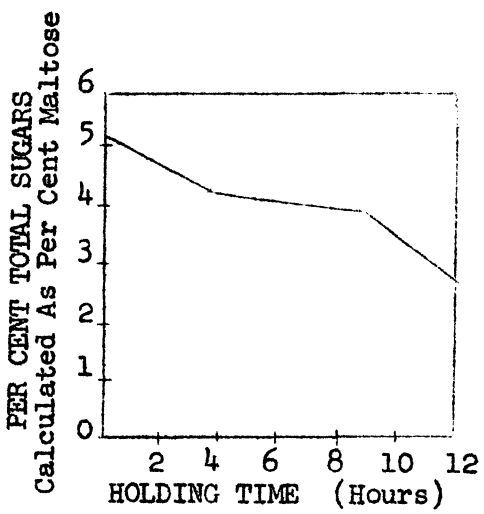
2/ Low cost for ice because cold well water accomplished about two-thirds of the cooling.

3/ Principally use of machinery and equipment. An estimated annual cost of $306 was spread over 20,000 dozen ears for the season. Does not include cost of electricity for pumping water and operating husker and cooler.

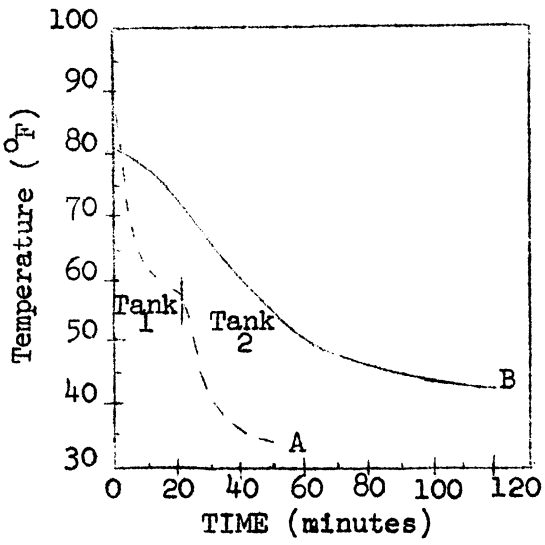
Effect of Precooling on Product Quality- The major advantage of precooling lies in its effect on maintaining the sugar content of the sweet corn. In this study the sugar content declined by 47 percent in sweet corn held at an average temperture of 75° F for 12 hrs. (See chart below). Field and Market temperatures are often higher than this. Tests also showed a loss of 8-12 percent of sugars in the first 3 hours from field to packing shed even though air temperatures at the time were unseasonally low.

In addition to sugar losses, an 8 percent moisture loss occurred in dry corn in a 20 hour period while less than a one percentage loss occurred in the refrigerated corn.

Precooling Methods - The rate of precooling was more rapid where the corn was run through an ice water bath than where the ice was placed in the bags and between the layers of bags (See chart below). Although the sweet corn in the ice bath cooling was about 10 degrees warmer at the start of the cooling period, it had reached as low a temperature after 30 minutes as that cooled by chipped ice after two hours.



Rate of sugar loss in Golden Cross Bantam sweet corn in husks when stored in the shade in burlap bags at an average air temperature of 75° F. (1950).



Cooling rate of sweet corn (A) hydrocooled in two stages with flowing water in tank 1 at 57°F. and iced water in tank 2 at about 33° F., and (B) in husks in burlap bags loaded on an insulated truck with ice between each layer of bags.

Source: "Marketing Fresh Sweet Corn in the Midwest", University of Minnesota Agr. Expt. Sta., Bul. 427, June 1954.

SWEET CORN PRICES

Prices of fresh sweet corn vary from day to day, week to week, year to year and market to market as well as for the different types of packs and of icing. Price comparisons on the Cleveland, Columbus and Cincinnati markets for the 1959 and 1960 seasons are shown on the following seven charts.

Year to year changes - In each of the three major Ohio markets the 1960 price was much more satisfactory than that for 1959. This difference ranged from 20-30 cents per dozen in early July to no difference in some instances in early or mid August. (Charts 1-4)

Changes from Week to Week - In each city and for each season the price during July, particularly early July, was from 10 to 30 cents a dozen above that for the seasonal low (Charts 1-4). Prices dropped rapidly until about August 1 and then in Columbus and Cleveland the price rose from about the end of August for the remainder of the season. For Cincinnati this late season rise was less apparent for the local corn, but there was an increase in the price in the corn from northern Ohio that was sold on the Cincinnati market. One explanation of this different price movement of the local and the northern Ohio corn on the Cincinnati market could be the relative market quality of corn from these sources late in the season when Cincinnati growers are more troubled with ear worms.

Iced vs. Non-iced Sweet Corn - Only in the Columbus Market News Reports was a good comparison of the price of iced and non-iced sweet corn possible. In this market the greatest price advantage of iced sweet corn was found during July both in 1959 and 1960 (Charts 5 & 6).

The premium for iced over non-iced corn was generally 10 cents or more per dozen ears. No doubt part of this premium was due to the better grade-quality of the sweet corn that was iced and the better reputation of the growers in the market.

Icing, as a practice, has been abused to such an extent that confidence of buyers in iced corn has not always been maintained. This abuse has consisted of too long a period from harvest to cooling, insufficient ice for proper cooling, too long a delay at the wholesale level and sometimes extended delays with poor temperature control at the retail level. Any of these can partially offset the advantage gained by the trouble and expense involved in icing. The fact that a premium of about 10 cents a dozen is paid for iced corn despite these failures attests to the tolerance of the wholesale, retail and consumer buyers for less than perfection.

Price Comparison for Cincinnati, Columbus and Cleveland - In 1960 the reported price of non-iced sweet corn in Cleveland was quite comparable to that for iced corn in Cincinnati and Columbus (Chart 7). However, the price of corn in Cincinnati was slightly higher during most of the month of August than that in either of the other markets. There were a few weeks when it would seem to have been profitable to ship sweet corn from one market to another. Due to the nature of the demand for sweet corn and the importance of quality and a reputation on the market for quality it is often not possible for an outside shipper to obtain the average price. Because of this fact, it is desirable for a shipper to attempt to maintain a reputation in more than one market. Many grower-shippers do this and profit thereby.

YIELD AND VALUE COMPARISONS

Yields per acre for Ohio sweet corn growers are similar or perhaps slightly higher than those for nearby states except Michigan. Current average yields for Ohio are about 120-5 dozen units or 600 dozen per acre (Chart 8).

Average farm value per 5-dozen unit for sweet corn in Ohio since 1950 has fluctuated from a high of about $1.90 in 1953 and a low of about $1.50 in 1959. Only in Pennsylvania have prices averaged as high in the 5 years (Chart 9).

CHART 1. PRICE PER DOZEN, SWEET CORN, LOCAL, DRY (NON-ICED), CLEVELAND, OHIO, JULY-SEPTEMBER, 1959 & 1960.

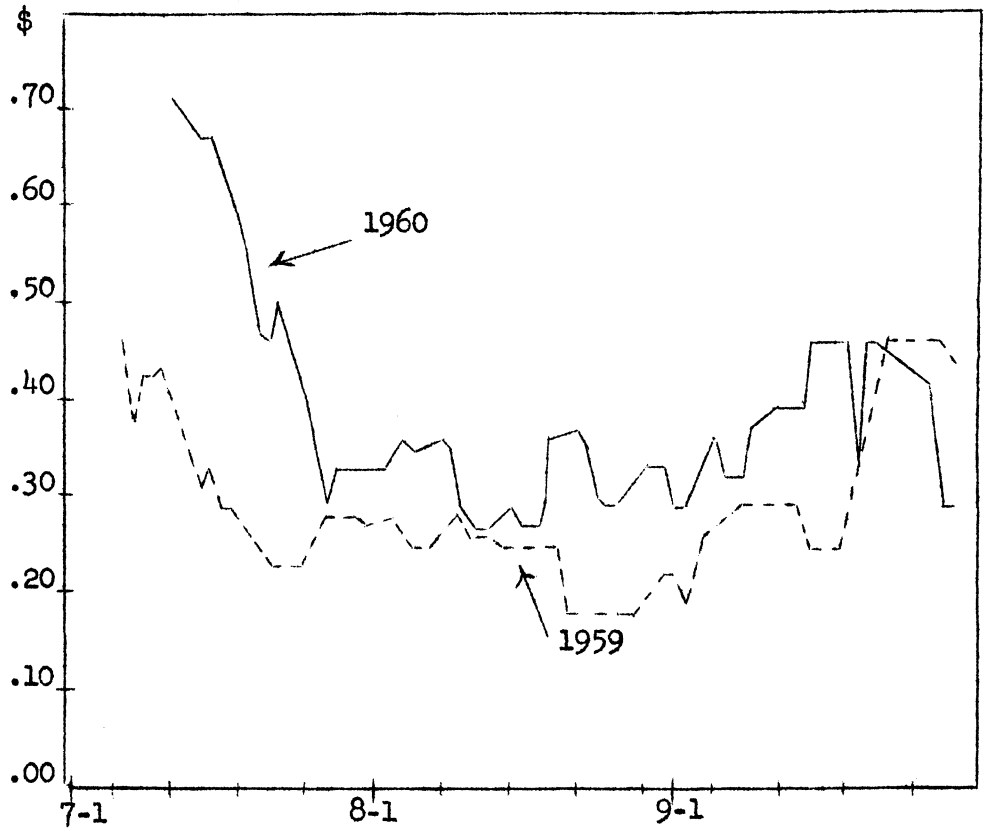


CHART 2. PRICE PER DOZEN, SWEET CORN, LOCAL, DRY (NON-ICED), COLUMBUS, OHIO, JULY-SEPTEMBER, 1959 & 1960.

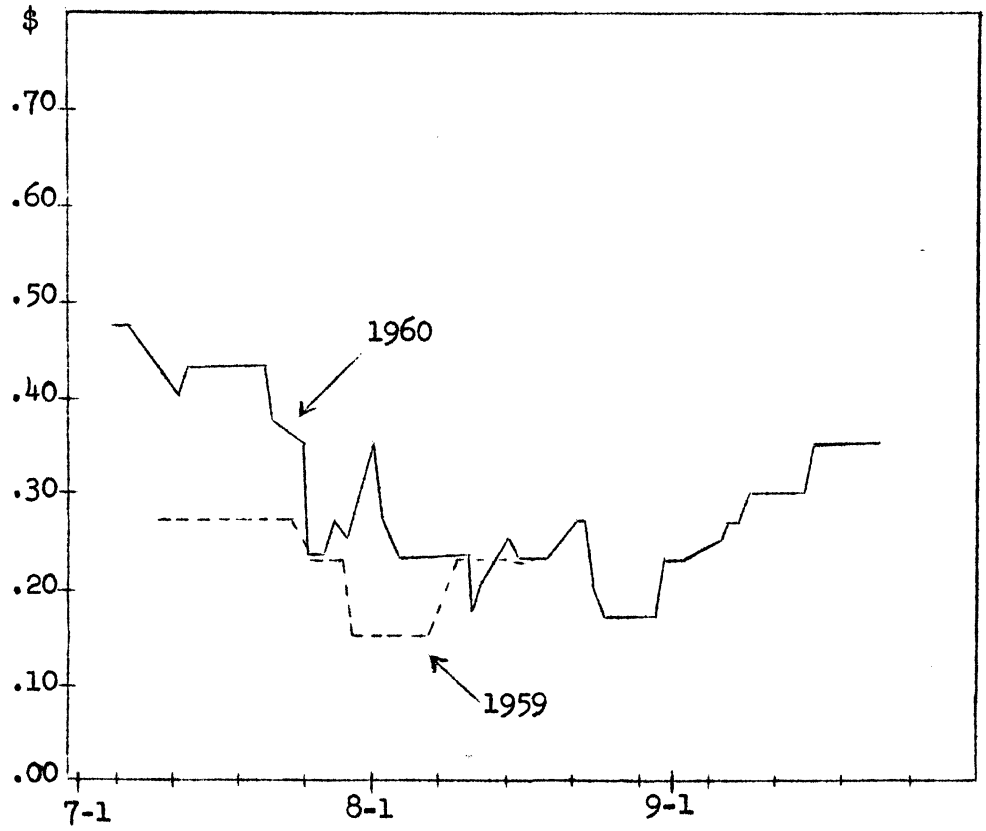


CHART 3. PRICE PER DOZEN, SWEET CORN, LOCAL, ICED, CINCINNATI, OHIO, JULY-SEPTEMBER, 1959-1960.

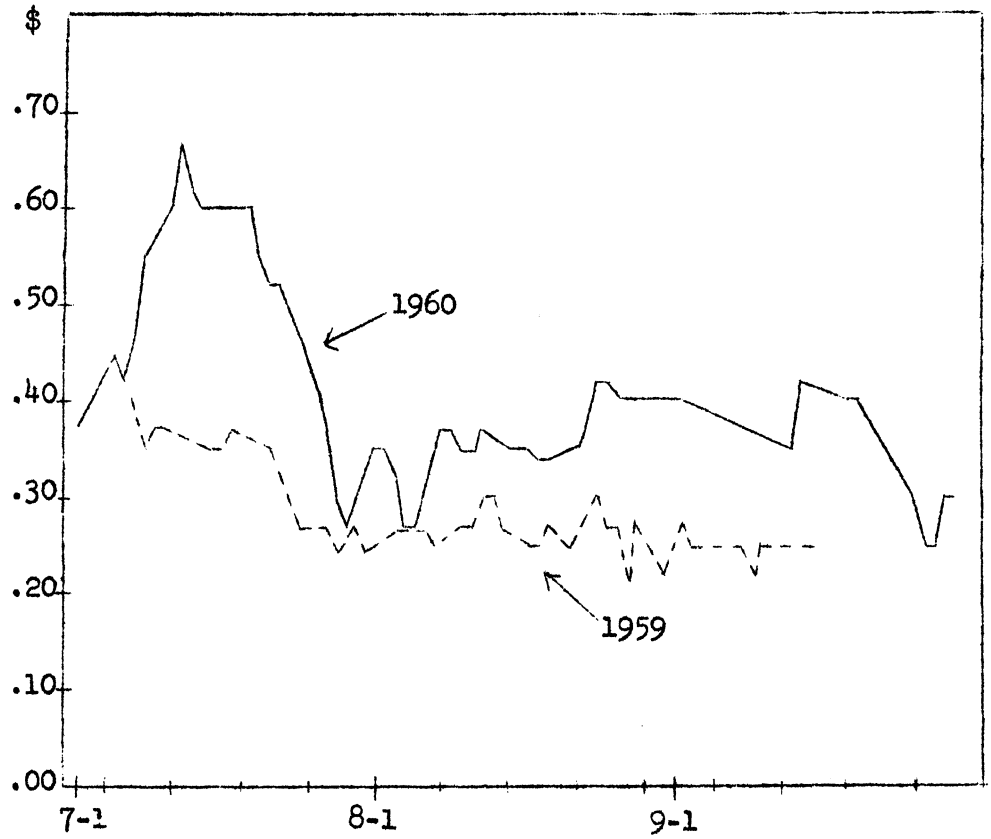


CHART 4. PRICE PER DOZEN, SWEET CORN, LOCAL, ICED, COLUMBUS, OHIO, JULY-SEPTEMBER, 1959-1960.

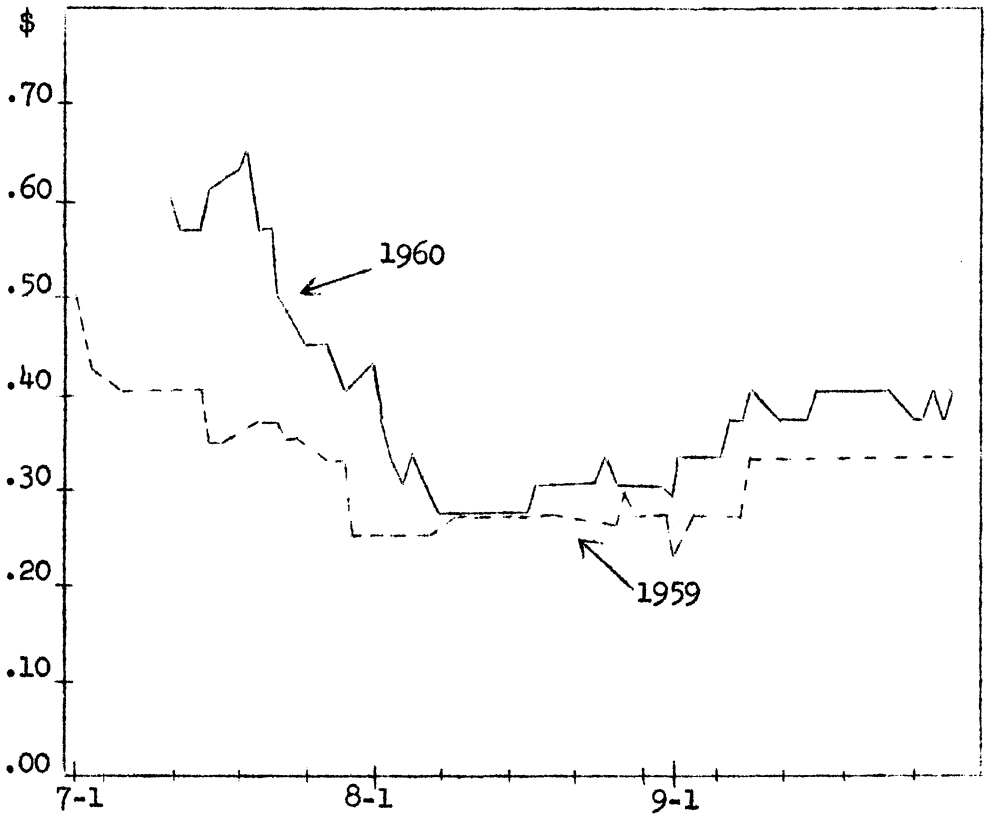


CHART 5. PRICE PER DOZEN, SWEET CORN, LOCAL, DRY (NON-ICED), AND ICED, COLUMBUS, OHIO, JULY-SEPTEMBER, 1959.

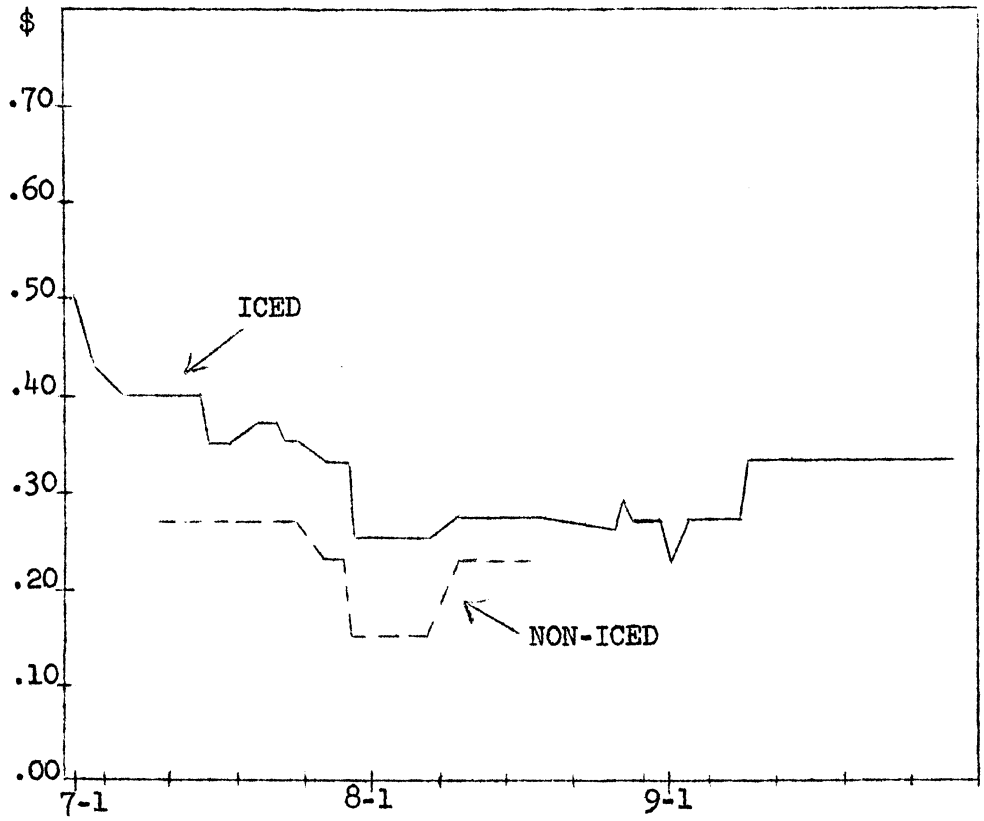


CHART 6. PRICE PER DOZEN, SWEET CORN, LOCAL, DRY (NON-ICED), AND ICED, COLUMBUS, OHIO, JULY-SEPTEMBER, 1960.

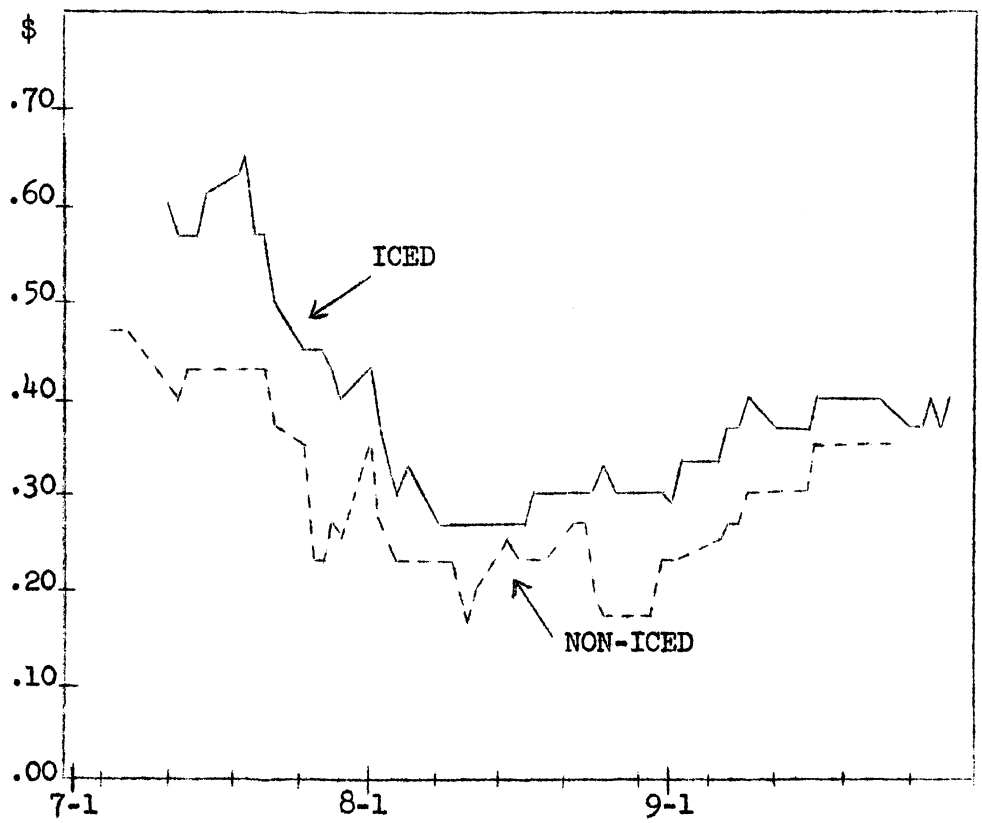
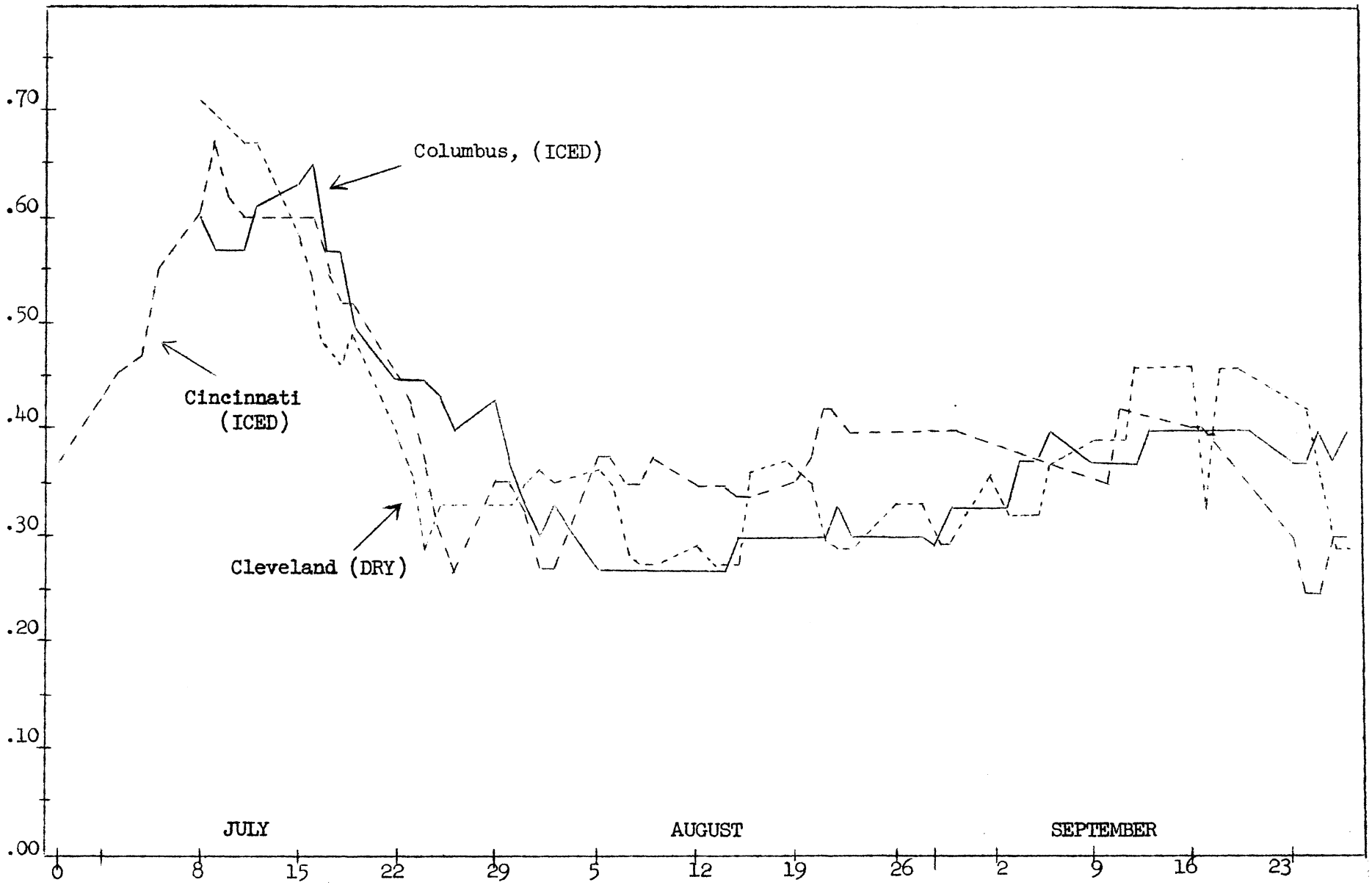


CHART 7. PRICE PER DOZEN, SWEET CORN, LOCAL, ICED - CINCINNATI AND COLUMBUS, OHIO, DRY (NON-ICED)- CLEVELAND, OHIO, JULY-SEPTEMBER, 1960.



SOURCE: Daily Market Reports, Federal-State Market News Service, Cleveland, Columbus, Cincinnati, July 1 - September 30, 1960

CHART 8. YIELD PER ACRE, SWEET CORN, FRESH MARKET, UNITS OF 5-DOZEN EARS (50 LBS.), MICHIGAN, OHIO, PENNSYLVANIA, NEW YORK, 1950 through 1960.

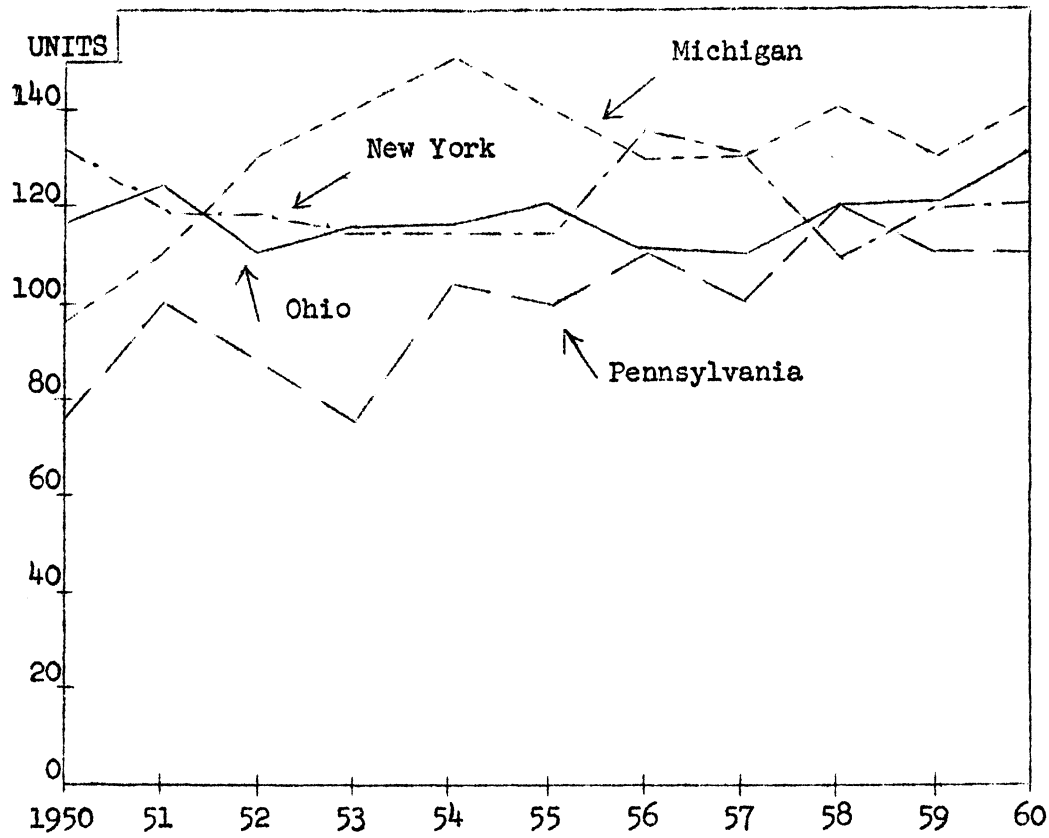
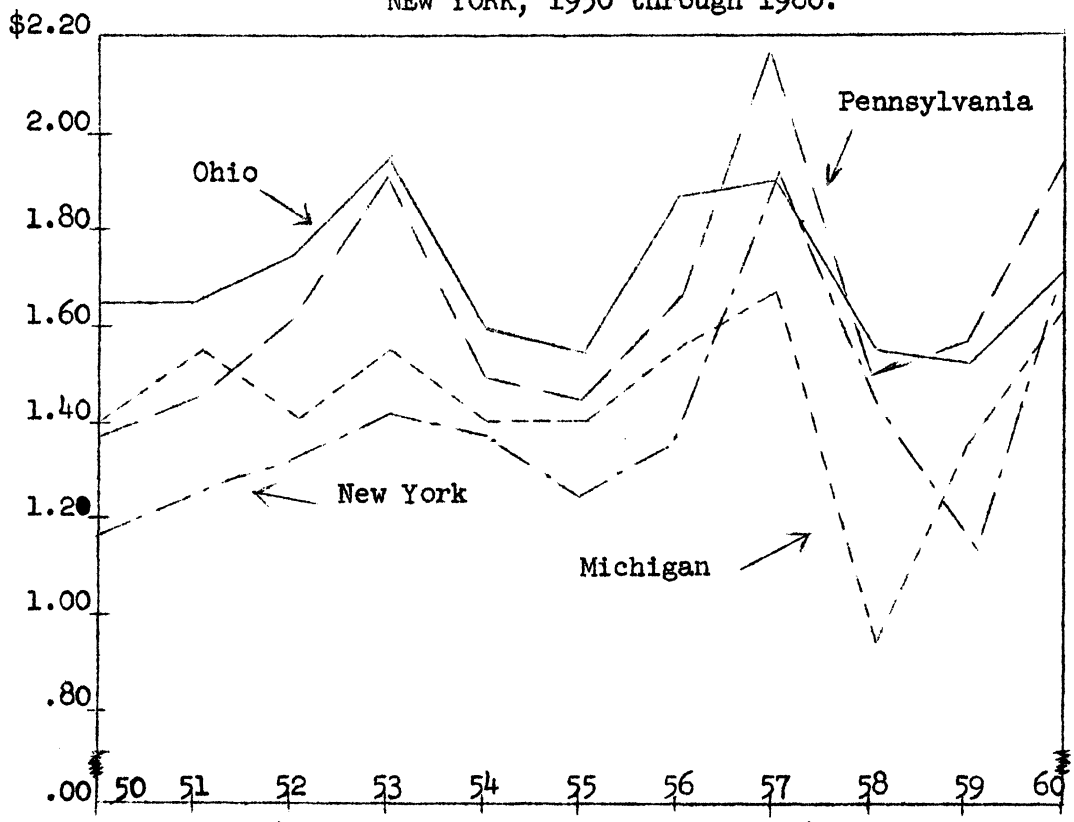


CHART 9. VALUE PER UNIT, SWEET CORN, FRESH MARKET, UNITS OF 5-DOZEN EARS (50 LBS.), MICHIGAN, OHIO, PENNSYLVANIA, NEW YORK, 1950 through 1960.



Source: (1) Vegetables For Fresh Market, 1949-55, Stat. Bull. #212 USDA-AMS, June, 1957. (2) Vegetables-Fresh Market, 1960 Annual Summary, USDA-AMS, Wash., D.C.

MARGINS AND COSTS IN MARKETING FLORIDA SWEET CORN

MAY 1955

Estimated Marketing Costs and Grower Return per Crate

Return to producer		
Price received per crate, U.S. Fancy grade sweet corn packed 5 dozen ears to a standard crate, f.o.b. shipping point, Belle Glade, Fla. (loaded in 560-crate car, 8 tons top ice furnished), May 6, 1955		$1.70
Less marketing expense:		
Charges for inspection to establish official grade	$0.023	
Top ice (8 tons per car)	.114	
Shipping-point selling charges	.09	
Precooling	.10	
Total shipping-point marketing expense	$0.327	.33
Return to grower for packed sweet corn		$1.37
Less harvesting and packing expenses:		
Cost of standard container	$0.35	
Cost of picking and packing	.35	
		.70
Gross return to grower for production		$0.67
Return to wholesale received		
Price received per crate, Baltimore wholesale market (loaded on buyer's truck), May 9-12, 1955		$2.75
Less f.o.b. shipping-point price	$1.70	
Less transportation cost: (560-crate car Belle Glade to Baltimore)		
Freight on corn	$327.49	
Standard refrigeration	63.48	
Freight on top ice	18.85	
Taxes	42.03	
Total per car	$451.88	
Total transportation cost per crate	$ .81	
		$2.51
Gross return to wholesale receiver		$0.24
Return to retailer		
Retail sale value per crate (allowing for waste and spoilage) at Baltimore, May 10-14, 1955		$3.87
Less Baltimore wholesale cost		$2.75
Gross return to retailer		$1.12

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Source: U.S.D.A. Misc. Pub. 179, Margins and Costs in Marketing Florida Sweet Corn; U.S.D.A. - A.M.S. and Fla. Agr. Expt. Sta., April, 1956.